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U.S. DEPARTMENT OF COMMERCE, PATENT AND TRADEMARK OFFICE

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TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

L&L8293

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

09/601313

INTERNATIONAL APPLICATION NO.
PCT/CH99/00586INTERNATIONAL FILING DATE
Dec. 7, 1999PRIORITY DATE CLAIMED
Dec. 10, 1998

TITLE OF INVENTION PLASTIC OBJECT FOR USE IN PERSONAL HYGIENE

APPLICANT(S) FOR DO/EO/US BEAT HUBER and PETER WALDISPÜHL

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☒ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☐ Other items or information:

09/601313

17. ☒ The following fees are submitted:**BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :**

Neither international preliminary examination fee (37 CFR 1.482)
nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO
and International Search Report not prepared by the EPO or JPO \$970.00

International preliminary examination fee (37 CFR 1.482) not paid to
USPTO but International Search Report prepared by the EPO or JPO..... \$840.00

International preliminary examination fee (37 CFR 1.482) not paid to USPTO but
international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$690.00

International preliminary examination fee paid to USPTO (37 CFR 1.482)
but all claims did not satisfy provisions of PCT Article 33(1)-(4) \$670.00

International preliminary examination fee paid to USPTO (37 CFR 1.482)
and all claims satisfied provisions of PCT Article 33(1)-(4) \$96.00

ENTER APPROPRIATE BASIC FEE AMOUNT =**CALCULATIONS** PTO USE ONLY

\$ 840.00

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30
months from the earliest claimed priority date (37 CFR 1.492(e)).

\$

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total claims	10 - 20 =	0	X \$18.00
Independent claims	2 - 3 =		X \$78.00

\$

\$

MULTIPLE DEPENDENT CLAIM(S) (if applicable) + \$260.00

\$

TOTAL OF ABOVE CALCULATIONS =

\$

Reduction of 1/2 for filing by small entity, if applicable. A Small Entity Statement
must also be filed (Note 37 CFR 1.9, 1.27, 1.28).

\$

840.00

SUBTOTAL =

\$

Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30
months from the earliest claimed priority date (37 CFR 1.492(f)).

\$

+

TOTAL NATIONAL FEE =

\$

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be
accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property

\$

+

TOTAL FEES ENCLOSED =

\$ 840.00

Amount to be refunded:	\$
charged:	\$

a. ☒ A check in the amount of \$ 840.00 to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees.
A duplicate copy of this sheet is enclosed.

c. ☐ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any
overpayment to Deposit Account No. _____. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO

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SIGNATURE

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Reg. No. 18,849

REGISTRATION NUMBER

09/601313

A 12783 US/WO

L&L8253

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of

BEAT HUBER and PETER WALDISPÜHL

Serial No.

OIPE

Filed Herewith

For: PLASTIC OBJECT FOR USE IN
PERSONAL HYGIENE

(National Phase of PCT/CH99/00586 f.12/07/98;

Priority: Switzerland Application No. 2448/98 f.12/10/98)

PRELIMINARY AMENDMENT

Hon. Commissioner of Patents and Trademarks
Washington D.C. 20231

Sir:

In connection with the above-identified application newly filed herewith, and before calculation of the filing fee, please amend the above-identified application as follows:

In the Specification:

Page 1, before line 3, insert the following captions and paragraph:

--- CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a U.S. National Stage application from PCT/CH99/00586 (WO 00/34022) filed December 7, 1999 and priority application in Switzerland No. 2448/98 filed December 10, 1998.

BACKGROUND OF THE INVENTION ---

line 4, cancel "according to the preamble of", and insert --- made of differing plastic materials ---;
line 5, cancel "claim 1".

Page 2, before line 1, insert the following caption:

--- BRIEF SUMMARY OF THE INVENTION ---

line 7, cancel "claim 1" and insert --- employing at least two differing plastic materials which do not bond to each other ---;

line 9, cancel "features of claim 10" and insert --- preferable sequential injection molding of differing plastics which do not bond to each other ---.

Page 3, before line 22, insert the following caption:

--- BRIEF DESCRIPTION OF THE DRAWINGS ---

Page 4, before line 17, insert the following caption:

--- DETAILED DESCRIPTION OF THE INVENTION ---

Page 9, line 25, change "30" to --- 45 ---;

line 29, change "30" to --- 45 ---; and,

line 31, (two occurrences) change "36" to --- 46 ---.

Page 10, line 3, change "30" to --- 45 ---.

In the Claims:

Cancel pages 11 and 12 *in toto*, including all numbered claims thereon.

On page 13:

Cancel lines 1-4, and insert --- What we claim is: ---.

Claim 2, line 4 (at page line 21), cancel "parts" and insert --- portions ---.

Claim 4, lines 1 and 2 (at page lines 30, 31), cancel "one of claims 1 to 3" and insert --- claim 1 ---

;

Claim 5, lines 1 and 2 (at page lines 33, 34), cancel "one of claims 1 to 4" and insert --- claim 1 ---

;

Claim 6, (page 14) lines 1 and 2 (at page lines 3, 4), cancel “one of claims 1 to 5” and insert --- claim 1 ---;

Claim 7, lines 1 and 2 (at page lines 8, 9), cancel “one of claims 1 to 5” and insert --- claim 1 ---;
line 4 (page line 11), cancel “consists”, and insert --- is selected from the group consisting ---;
line 5, cancel “or” (first occurrence) and insert a comma; cancel “or” (second occurrence) and insert --- and ---.

Claim 8, line 1, cancel “as claimed”;
line 2 (page line 15), cancel “in one of claims 1 to 7”;
line 3, cancel “wherein” and insert --- comprising the steps of injection molding ---; same line, cancel “is”;
line 4, cancel “injection-molded”;
line 5, after “and”, insert --- subsequently injection molding ---;
line 6, cancel “is subsequently injection-molded”.

Claim 10, line 1 (page line 33), cancel “one of claims 8 or 9”, and insert --- claim 8 ---.

In the Abstract:

Please insert the attached page of Abstract as new page 15.

REMARKS

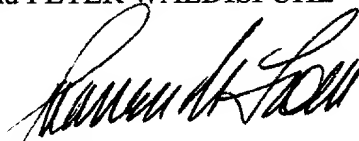
This amendment places the application in better form under U.S. practice for examination. As amended, the application includes 10 claims of which Claims 1 and 8 are independent. There are no multiple dependent claims.

This case is a National Stage of a PCT case. The application includes originally filed PCT claims 1-12 on pages 11 and 12. These claims have been replaced by new Claims 1-10 on pages 13 and 14. Accordingly, the original claims have been cancelled hereby.

Further, minor amendments to the specification and to the claims have been made to comport the same to the practice and remove any indefiniteness. The drawings have been very slightly amended from the PCT application to properly include reference characters "A" and "B", which appear in the specification.

Respectfully submitted,

BEAT HUBER and PETER WALDISPÜHL



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July 27, 2000

Plastic object for use in personal hygiene

The invention relates to a plastic object for use in personal hygiene according to the preamble of claim 1 and to a method of producing the plastic object.

A plastic object of this type takes the form, for example, of a toothbrush. Toothbrushes are mass-produced articles and must therefore allow cost-effective production. Toothbrushes made of a single plastic material and toothbrushes made of two plastic components, which are produced for example by the two-component injection-molding process, are known. In the latter case, the toothbrush comprises two plastic parts: a first plastic part made of a first plastic material, for example polypropylene, extends from the handle of the toothbrush up to the brush head and has interconnected recesses. A second plastic part made of a second plastic material, for example thermoplastic elastomer, fills the recesses of the first plastic part. These two plastic materials bond with one another at the surface where the two plastic parts touch. In comparison with a toothbrush made of only one plastic material, this provides greater scope for design. Since, however, the two plastic materials have to bond with one another during the injection-molding operation, there are restrictions in the selection of the plastic materials and consequently in the design of the toothbrush.

This problem also affects other plastic objects for use in personal hygiene comprising at least two parts made of different plastic materials, such as for example containers or closure caps for containers intended for personal-hygiene preparations and substances, or for medical and dental preparations. There are restrictions in the selection of materials for the two parts in the case of such plastic objects as well.

The present invention is based on the object of providing a plastic object of the type mentioned at the beginning with which varied design is possible along with cost-effective production.

5 This object is achieved according to the invention by a plastic object having the features of claim 1. The method of producing such a plastic object is distinguished according to the invention by the features of claim 10. Preferred developments of the
10 plastic object according to the invention and of the method according to the invention form the subject matter of the dependent claims.

 The fact that the two parts of the plastic object are formed by at least two molded parts
15 consisting of different plastic materials which do not bond with one another during the injection-molding operation and are joined to one another in particular by a non-positive and/or positive fit means that there are many possibilities for an expedient design of the
20 plastic object. Plastic materials of different chemical character can be used. They may differ to a greater or lesser extent in their structural formula and their chemical components. At the surfaces where they touch, there do not have to be any chemical or
25 physical bonds, for example in the form of bridge formations or van der Waals forces, between the plastic materials. The frictional forces alone between the molded parts in the joint, preferably constructed in the manner of a shrink fit, are adequate to join the
30 two molded parts firmly to one another. The positive fit realized by means of parts engaging in one another at the surfaces where the two molded parts touch prevents gaps into which water and contaminants can penetrate, or which can even lead to rupture, from
35 forming between the two molded parts during the shrinking operation.

 Therefore, in the case of a toothbrush for example, plastic materials with advantageous properties

can be used at the right place. The one molded part may consist, for example, of polypropylene (polypropylene is available inexpensively, is flexible, chemically resistant but not completely transparent), while styrene acrylonitrile (SAN) (likewise inexpensive, transparent, esthetic) may be chosen for example for the other molded part. The molded part bearing the brush head is advantageously produced from polypropylene, since polypropylene is resistant to the often aggressive substances of the tooth-cleaning agents.

The two plastic materials advantageously have a different shrinkage behavior, since a firm shrink fit can be achieved more easily in this way. In this case, that molded part which is produced from plastic material with the lower degree of shrinkage is advantageously produced in a first step. The second molded part is produced from plastic material with the greater degree of shrinkage in a second step, thereby achieving a natural pressure of the second plastic material pressing against the first plastic material.

The invention is explained in more detail below with reference to the drawing, in which:

Figure 1 shows a first exemplary embodiment of a toothbrush comprising two molded parts in side view and partially in longitudinal section;

Figure 2 shows the toothbrush according to Figure 1 in plan view;

Figure 3 shows the toothbrush according to Figure 1 in a view from below;

Figure 4 shows a first molded part of the toothbrush according to Figure 1 in elevation and partially in longitudinal section;

Figure 5 shows the molded part according to Figure 4 in plan view;

Figure 6 shows a second molded part of the toothbrush according to Figure 1 in plan view;

Figure 7 shows a section along line VII-VII in Figure 6;

Figure 8 shows a joint of the two molded parts according to Figure 1 on an enlarged scale;

5 Figure 9 shows a section along line IX-IX in Figure 2 on an enlarged scale;

Figure 10 shows a second exemplary embodiment of a toothbrush comprising two molded parts in side view;

10 Figure 11 shows the toothbrush according to Figure 10 in plan view; and

Figure 12 shows the toothbrush according to Figure 10 on an enlarged scale, in side view and partially in section, a closure part for closing a
15 handle cavity from the remaining part of the toothbrush being represented separately.

According to Figures 1 to 3, a toothbrush 1 has a first molded part 2, which bears a brush head 3 in its front region 2a. The first molded part 2,
20 consisting of a plastic material A, is enclosed over a portion of its length, to be specific its rear handle region 2b, by a second molded part 4, consisting of a plastic material B, and is non-positively joined to the latter in the manner of a shrink fit. The plastic
25 materials A and B are plastic materials of a kind which do not bond with one another during the injection-molding operation at the surfaces where they touch.

For better illustration, the two molded parts 2, 4 are represented separately from one another in
30 Figures 4 to 7. The two molded parts 2, 4 have - as described further below - in the region where they touch diametrically opposite projections and recesses engaging in one another, by means of which a positive fit of the two molded parts 2, 4 is realized in
35 addition to the non-positive fit of the same. It goes without saying that this joint is only produced during the injection-molding operation, in which one of the molded parts is injection-molded in a first step and

then the other molded part is injection-molded around or into the first part in a second step. With the different degree of shrinkage of the two molded parts 2, 4, that molded part which is to be produced from plastic material with a lower degree of shrinkage is advantageously injection-molded first. In the second step, injection-molding of the other molded part takes place from plastic material with a greater degree of shrinkage, whereby a natural pressure of the second plastic material pressing against the first plastic material is produced.

The second molded part 4, represented individually in Figures 6 and 7 and essentially forming the toothbrush handle, is designed in the form of a sleeve, i.e. is provided with an internal longitudinal bore 7, which corresponds in its shape and diameter to the rear handle region 2b of the first molded part 2, represented individually in Figures 4 and 5. The sleeve-shaped molded part 4 has an outer surface 6.

A front end face 8 of the sleeve-shaped second molded part 4 is assigned to an offset surface 9 of the first molded part 2 (Figure 4), seen in the longitudinal direction of the toothbrush. In this case, an annular, front projection 10 of the second molded part 4 protrudes into a diametrically opposite recess 11 of the first molded part 2, which can be seen particularly well from Figure 8. A rear end face 14 of the sleeve-shaped second molded part 4 is assigned to an offset surface 16 of an end piece 15 of the first molded part 2. Here, too, an annular, rear projection 17 of the second molded part 4 protrudes into a diametrically opposite recess 18 of the end piece 15.

The second molded part 4 is provided with a cross-sectionally oval, elongate cross-bore 20, which is arranged transversely to the longitudinal bore 7 and is intended for a diametrically opposite part 21 of the first molded part 2, penetrating through the cross-bore 20. The oval part 21 has an upper edge surface 22 and

a lower edge surface 22'. The second molded part 4 is provided with offset surfaces 23, 23', which run around the cross-bore 20 and are diametrically opposite the edge surfaces 22, 22'. The edge surfaces 22, 22' and the offset surfaces 23, 23' in turn form a type of projection/recess positive-fitting joint between the two molded parts 2, 4.

Together with outer surfaces 19, 19' (Figure 4) of the oval part 21, the outer surface 6 of the sleeve-shaped molded part 4 forms a handle surface.

As far as the material for the two molded parts 2, 4 is concerned, polypropylene (PP) may be advantageously chosen, for example, as the plastic material A for the first molded part 2, while the second molded part 4 may consist, for example, of the following plastic materials B:

styrene acrylonitrile (SAN) and subgroups,
acrylonitrile-butadiene styrene (ABS) and subgroups,
polyamide (PA) and subgroups,
polycarbonate (PC) and subgroups,
polyester (PBT) and subgroups, or other transparent plastic materials not bonding with polypropylene (PP).

The respective subgroups comprise the plastic materials belonging to the corresponding family.

This combination of materials provides a special advantage. Since modern tooth-cleaning agents often contain aggressive substances, such as peppermint oil for example, cheap plastics, such as SAN for example, are often attacked. If the first molded part 2, bearing the brush head 3, is made of PP, which is resistant to the aggressive substances but not completely transparent, and the second molded part 4, comprising the handle, is made of transparent, but less resistant SAN, this special embodiment of the invention constitutes a toothbrush which can be produced cost-effectively, is resistant to the aggressive substances

of the tooth-cleaning agents and is also able to be esthetically pleasing. Of course, any other resistant plastic material may be used instead of PP and one of the cheaper, and therefore generally less resistant, plastic materials mentioned above may be used, for example, instead of SAN.

With these combinations of materials, preferably the second, sleeve-shaped molded part 4 is produced first, by means of injection molding, in a first step. Subsequently, the first molded part 2 is injection-molded in a second step, the positive fit already described being produced in the region where the two molded parts 2, 4 touch. The greater degree of shrinkage of the last-molded material A (PP) of the first part 2 has the effect of producing a natural pressure, pressing against the second part 4 consisting of material B (for example SAN), and a non-positive and positive fit of the two molded parts 2, 4 is brought about by the projections 10, 17, 22, 22' engaging in recesses 11, 18, 23, 23', without gaps into which water and contaminants can penetrate, or which can even lead to a rupture, forming between the plastic materials A, B, which actually do not bond with one another.

As an example, a toothbrush 1 comprising two molded parts 2, 4 has been presented and described. A different configuration of the two molded parts would be quite possible. The sleeve-shaped configuration of one of the molded parts is not absolutely necessary.

It goes without saying that a toothbrush could also have a plurality of molded parts made of plastic materials not bonding with one another during the injection-molding operation, which are joined to one another by a non-positive and/or positive fit.

Instead of the shrink fit and positive fit described, the individual molded parts, which do not enter into an adhesive or cohesive bond during the injection-molding operation, could be non-positively

and/or positively joined to one another in any other way.

However, molded parts comprising two or more plastic components of which, for example, one (or more) component(s) of the one molded part cannot be bonded with one (or more) component(s) of the other molded part, could also be non-positively and/or positively joined to one another.

Represented in Figures 10 and 11 is a second exemplary embodiment of a toothbrush 1', which likewise has two molded parts 32, 34 consisting of different plastic materials A and B which do not bond with one another during the injection-molding operation. Here, too, the first molded part 32 forms a toothbrush part bearing the brush head 3' (the bristles of the brush head 3' are not represented in Figures 10 and 11; only the depressions 35 intended for anchoring tufts of bristles can be seen). The second molded part 34 forms a toothbrush handle. This is provided over part of its length with a cylindrical hollow 36, by which a cavity 37 which is open toward the rear and can be closed by means of a closure part 38 is formed in the toothbrush handle. The second molded part 34 preferably consists of an at least partially transparent or translucent material component, for example SAN, so that various esthetically acting means (loose objects, liquid, powder, printed rollers etc.) can be visibly accommodated in the cavity 37. The closure part 38 may be joined undetachably or detachably to the second molded part 34. In the latter case, useful objects, such as toothpicks or ampoules with mouth wash or toothpaste, may also be accommodated, for example, in the cavity 37.

In the case of this embodiment of a toothbrush as well, the surfaces where the two molded parts 32, 34 touch are provided with parts 40, 41 engaging in one another, so that the two plastic parts are brought into a non-positive and positive fit during injection

molding. The parts 40, 41 engaging in one another are formed, for example, by a projection 40 on the end face of the molded part 34 forming the handle and a diametrically opposite recess 41 on the end face of the
5 other molded part 32.

If the handle is produced from the transparent SAN, it is also the case with this embodiment that this handle-forming molded part 34 is preferably produced first in the injection-molding process and the molded
10 part 32, bearing the brush head, is subsequently injection-molded, for example from more resistant polypropylene.

Both the bristle-bearing part of the toothbrush and the handle may have parts consisting of further
15 material components. For example, a depression for a thumb rest 42, of a further material component, for example a thermoplastic elastomer (TPE), may be provided, for example, in the molded part 34.

The toothbrush shown in Figure 12 corresponds
20 to the toothbrush 1' according to Figures 10 and 11, but is represented on an enlarged scale in comparison with Figure 10 and partially in section (the same parts are denoted by the same reference numerals). This toothbrush 1' is intended for the insertion of
25 variously filled ampoules 30, for which a holder 46 of an elastically compliant plastic is present in the front region of the hollow 36. The closure part 38 is provided on the inside with an elastically compliant counterholder 38'. The ampoule 30 is held both
30 radially and axially in its position by the two holders 36, 38'. The holder 36 may, for example, be injection-molded from the same plastic (preferably from PP) and in the same step with the molded part 32 bearing the brush head 3' (the joining channel present for this is
35 denoted by 47 in Figure 12). From the same plastic material and in the same step, a cross-bore 48 may also be filled in the molded part 34 injection-molded first

(for example from SAN), whereby the thumb rest 42 is formed on the outer side of the handle.

The ampoules 30 may contain various esthetically acting objects (loose or suspended in a liquid), liquid, powder etc.

As already mentioned, other plastic objects similar to toothbrushes for use in personal hygiene could be formed from at least two molded parts which consist of different plastic materials which do not bond with one another during the injection-molding operation, and which are joined to one another by a non-positive and/or positive fit. For example, in the case of containers or closure caps for containers which are intended for personal-hygiene preparations and substances, or for medical and dental preparations, plastics with advantageous properties could likewise be used at the right place in cost-effective production.

Patent claims

1. A plastic object for use in personal hygiene, comprising at least two parts of different plastic materials, wherein the two parts of the plastic object are formed by at least two molded parts (2, 4; 32, 34) consisting of different plastic materials (A, B) which do not bond with one another during the injection-molding operation and are joined to one another in particular by a non-positive and/or positive fit.

2. The plastic object as claimed in claim 1, wherein the plastic object is a toothbrush (1; 1') and the one molded part (2; 32) is a toothbrush part bearing a brush head (3) and the other molded part (4; 34) is a toothbrush part forming at least part (6) of a handle.

3. The plastic object as claimed in claim 1 or 2, wherein, for forming a non-positive, firm fit between the two molded parts (2, 4; 32, 34), the one molded part (2; 32) is at least partially enclosed by the other molded part (4; 34) in a kind of shrink fit.

4. The plastic object as claimed in one of claims 1 to 3, wherein a positive fit is formed at least on part of the surface where the two molded parts (2, 4; 32, 34) touch by parts (10, 11; 16, 17; 22, 23; 22', 23'; 40, 41) of the two molded parts (2, 4; 32, 34) engaging in one another.

5. The plastic object as claimed in claim 4, wherein the positive fit is formed by projections (10, 17, 22, 22', 40) on one molded part (4; 34 and 2; 32, respectively) and recesses (11, 18, 23, 23', 41) on the other molded part (2; 32 and 4; 34, respectively) engaging in one another.

6. The plastic object as claimed in one of claims 1 to 5, wherein the plastic materials (A, B) have a different degree of shrinkage.

7. The plastic object as claimed in one of claims 1 to 6, wherein at least one of the two molded parts

(2; 32 and 4; 34, respectively) consists of two or more plastic components of which at least one cannot be bonded with the plastic material (A or B) of the other molded part (4; 34 and 2; 32, respectively).

5 8. The plastic object as claimed in one of claims 2 to 7, wherein the one molded part (2; 32), which forms the toothbrush part bearing the brush head (3), consists of polypropylene and the other molded part (4; 34) consists of styrene acrylonitrile.

10 9. The plastic object as claimed in one of claims 2 to 7, wherein the one molded part (2; 32), which forms the toothbrush part bearing the brush head (3), consists of polypropylene and the other molded part (4; 34) consists of acrylonitrile-butadiene styrene or
15 polyamide or polycarbonate or polyester.

10. A method of producing a plastic object as claimed in one of claims 1 to 9 by means of injection molding, wherein one of the molded parts (2; 32 or 4; 34) is injection-molded from a first plastic material
20 (A or B) in a first step and the other molded part (4; 34 or 2; 32) is subsequently injection-molded from a second plastic material (B or A), which does not bond with the first plastic material during the injection-molding operation, in a second step.

25 11. The method as claimed in claim 10, wherein, with the different degree of shrinkage of the two plastic materials (A, B) intended for the molded parts (2, 4; 32, 34), that molded part (4; 34 or 2; 32) which is produced from plastic material (A or B) with the
30 lower degree of shrinkage is injection-molded in the first step.

12. The method as claimed in one of claims 10 or 11, wherein, in the production of a toothbrush (1; 1'), the molded part (4; 34) forming at least part (6) of a
35 toothbrush handle is injection-molded from styrene acrylonitrile in a first step and the molded part (2; 32) bearing the brush head (3) is subsequently injection-molded from polypropylene in a second step.

AMENDED CLAIMS

[received at the International Bureau on May 3, 2000
(05.03.00); original claims 1-12 replaced by new claims
1-10 (3 pages)]

5

1. A toothbrush comprising a first molded part (2; 32), having a brush head (3), and a second molded part (4; 34), forming at least part of a handle, the two molded parts (2, 4; 32, 34) consisting of different plastic materials, wherein the two molded parts (2, 4; 32, 34) are formed from different plastic materials (A, B) which do not bond with one another during the injection-molding operation and wherein, for producing a non-positive, firm fit between the two molded parts (2, 4; 32, 34), the one molded part (2; 32) is at least partially enclosed by the other molded part (4; 34) in the manner of a shrink fit.

2. The toothbrush as claimed in claim 1, wherein a positive fit is formed at least on part of the surface where the two molded parts (2, 4; 32, 34) touch by parts (10, 11; 16, 17; 22, 23; 22', 23'; 40, 41) of the two molded parts (2, 4; 32, 34) engaging in one another.

3. The toothbrush as claimed in claim 2, wherein the positive fit is formed by projections (10, 17, 22, 22', 40) on one molded part (4; 34 and 2; 32, respectively) and recesses (11, 18, 23, 23', 41) on the other molded part (2; 32 and 4; 34, respectively) engaging in one another.

4. The toothbrush as claimed in one of claims 1 to 3, wherein the plastic materials (A, B) have a different degree of shrinkage.

5. The toothbrush as claimed in one of claims 1 to 4, wherein at least one of the two molded parts (2; 32 and 4; 34, respectively) consists of two or more plastic components of which at least one cannot be

bonded with the plastic material (A or B) of the other molded part (4; 34 and 2; 32, respectively).

6. The toothbrush as claimed in one of claims 1 to 5, wherein the first molded part (2; 32), having the
5 brush head (3), consists of polypropylene and the other, second molded part (4; 34) consists of styrene acrylonitrile.

7. The toothbrush as claimed in one of claims 1 to 5, wherein the first molded part (2; 32), having the
10 brush head (3), consists of polypropylene and the other, second molded part (4; 34) consists of acrylonitrile-butadiene styrene or polyamide or polycarbonate or polyester.

8. A method of producing a toothbrush as claimed
15 in one of claims 1 to 7 by means of injection molding, wherein one of the molded parts (2; 32 or 4; 34) is injection-molded from a first plastic material (A or B) in a first step and the other molded part (4; 34 or 2; 32) is subsequently injection-molded from a second
20 plastic material (B or A), which does not bond with the first plastic material during the injection-molding operation, in a second step, so that the one molded part (2; 32) is at least partially enclosed by the other molded part (4; 34) in the manner of a shrink
25 fit.

9. The method as claimed in claim 8, wherein, with a different degree of shrinkage of the two plastic materials (A, B) intended for the molded parts (2, 4; 32, 34), that molded part (4; 34 or 2; 32) which is
30 produced from the plastic material (A or B) with the lower degree of shrinkage is injection-molded in the first step.

10. The method as claimed in one of claims 8 or 9, wherein the molded part (4; 34) forming at least part
35 (6) of a toothbrush handle is injection-molded from styrene acrylonitrile in a first step and the molded

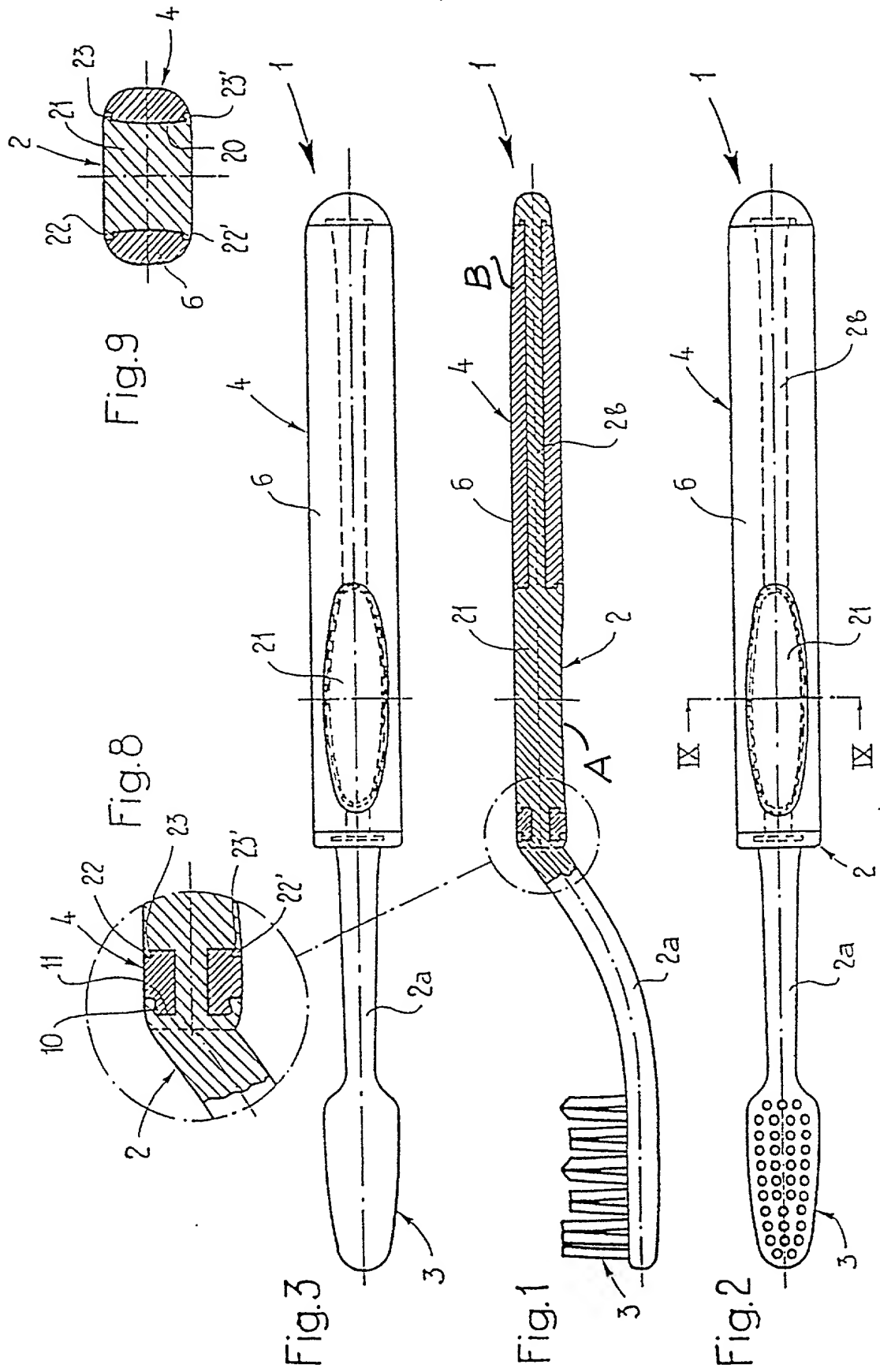
part (2; 32) bearing the brush head (3) is subsequently injection-molded from polypropylene in a second step.

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ABSTRACT OF THE DISCLOSURE

A unitary two component article for personal hygiene, as a toothbrush, wherein the same is formed by injection molding of two differing plastic materials, which plastics do not adhesively or chemically bond to each other, thereby facilitating the manufacturing process. The two differing plastic parts of the toothbrush are mechanically connected, as by interfitting portions of the two plastic components and as by shrinking one plastic component about the other.

1. A unitary two component article for personal hygiene, as a toothbrush, wherein the same is formed by injection molding of two differing plastic materials, which plastics do not adhesively or chemically bond to each other, thereby facilitating the manufacturing process. The two differing plastic parts of the toothbrush are mechanically connected, as by interfitting portions of the two plastic components and as by shrinking one plastic component about the other.



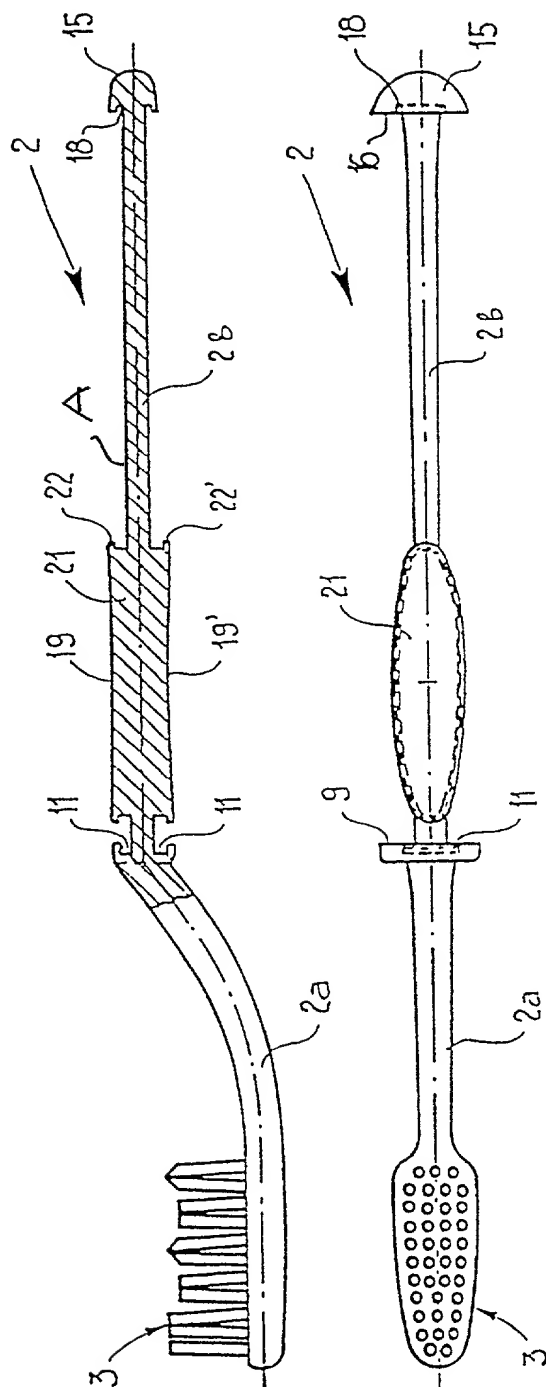


Fig. 4

Fig. 5

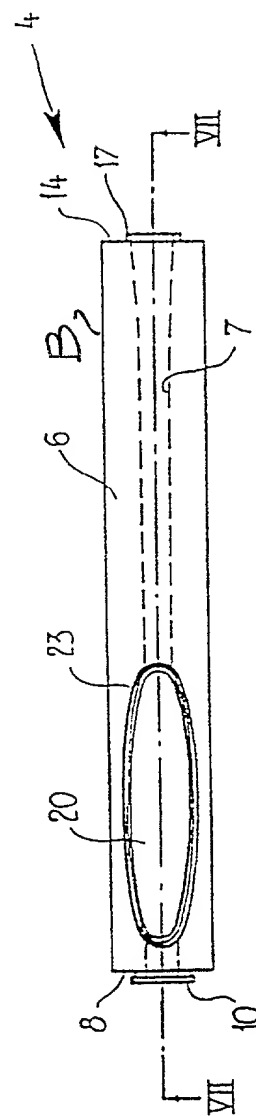


Fig. 6

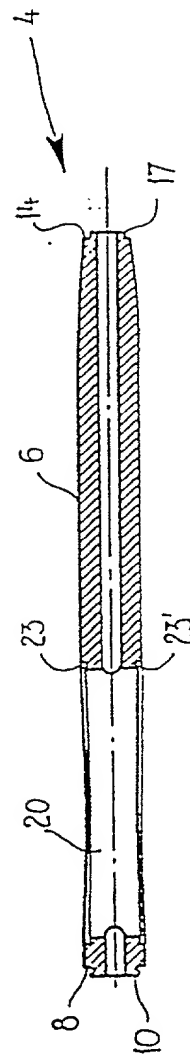


Fig. 7

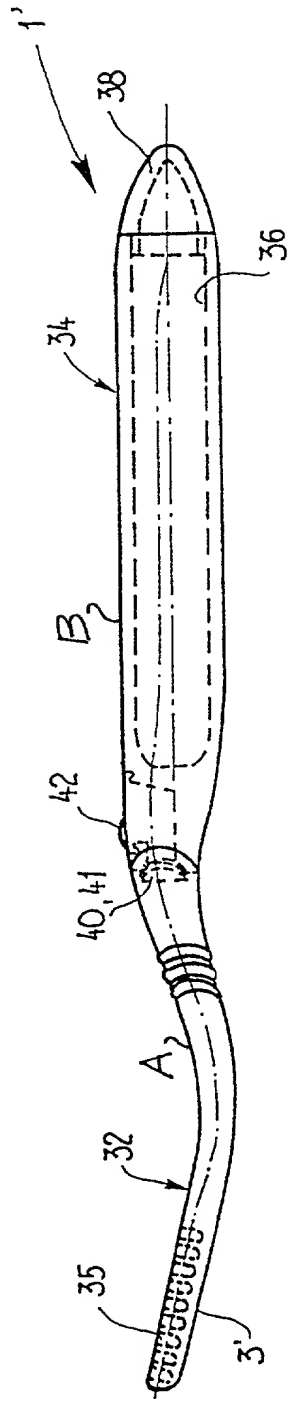


Fig. 10

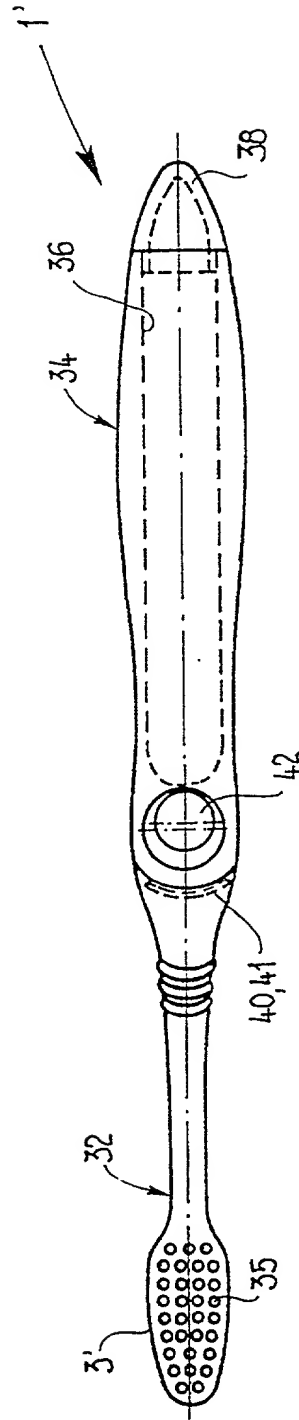


Fig. 11

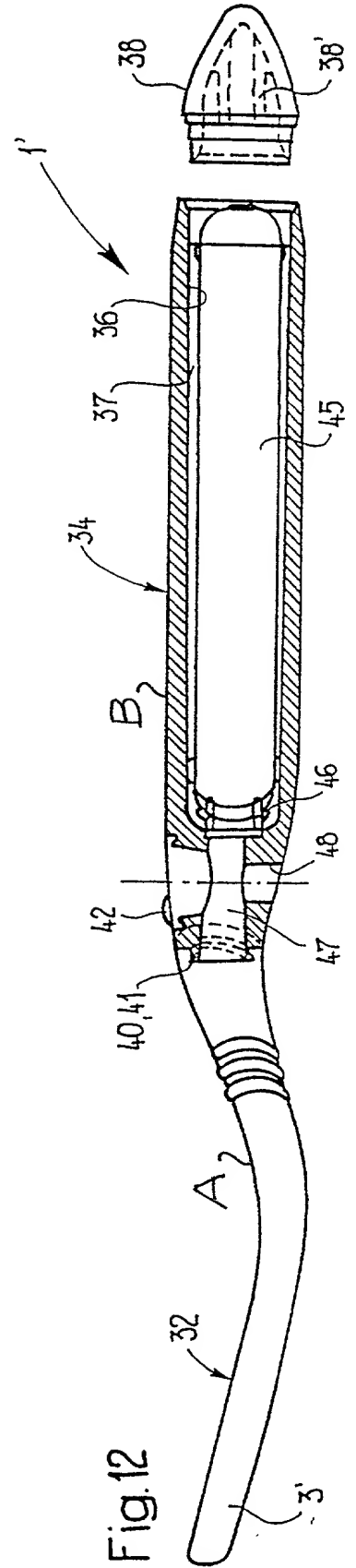


Fig. 12

DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe that I am the original, first and sole inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

PLASTIC OBJECT FOR USE IN PERSONAL HYGIENE

the application for which

☐ is attached hereto; or

☒ was filed on 08/07/00 as application S.N. 09/601,313
and was amended on 08/07/00 (if applicable)

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of federal regulations, Sec. 1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, Sec. 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below and foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application:		Priority Claimed?	
PCT/CH99/00586		Dec. 7, 1999	Yes
2448/98	Switzerland	Dec. 10, 1998	Yes
(Number)	(Country)	(Month/day/year filed)	(Yes No)

I hereby claim the benefit under Title 35, United States Code, Sec. 120 of any United States applications listed below and insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Sec. 112, I acknowledge the duty to disclose material information as defined in Title 37, C.F.R., Sec. 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

I hereby appoint the following attorneys to prosecute this application and to transact all business in the United States Patent and Trademark Office connected therewith:

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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statement and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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